services once standards have been established will take additional time. While Vanguard believes that all of the objectives set out in the Notice vis-a-vis ALI can ultimately be achieved, the schedule proposed by the Commission for implementing advanced ALI capabilities is simply too aggressive.

Vanguard agrees that implementing ALI capabilities in a series of progressive steps is a valid approach for mobile radio networks, especially considering the present state of technology and the high cost that will be involved in implementing advanced ALI. A rollout of ALI features over time would permit less difficult functions to be provided first, with greater time allowed for developing standards and methods to implement ALI capabilities that are more technically demanding.

STEP I

As a first step, the Commission proposes that wireless base stations be capable, within one year after the effective date of the new rules, of routing 911 calls with sufficient information to permit connection of the mobile station to the PSAP closest to the mobile caller. The Commission suggests that this limited ALI information, at a minimum, should indicate the location of the base station receiving the 911 call and, if sectored antennas are employed, the direction (sector) of the mobile unit from the base station or cell site.

Vanguard believes, based on discussions with its principal equipment supplier, that the Commission's STEP I proposal for limited ALI is feasible, but that the allowable time for implementing these features should be three years from the

effective date of the order adopting new rules. A number of important tasks will need to be accomplished during this time.

Developing the capabilities for a PSAP to receive even basic information about the location of a caller within a mobile system will require enhancements to inband Centralized Automatic Message Accounting (CAMA), the current 911 signaling standard. Today there are limitations on the information that a switch can send over a CAMA signaling link to a 911 tandem switch and then to a PSAP. Specifically, the current CAMA signaling standard will permit the transmission of either a cell site identification number, which is typically 5 digits, or a 7-digit mobile telephone number (without area code), but not both. This limitation means, in practical terms, that if cell site information is transmitted to the PSAP using 911 CAMA signaling, then the mobile number cannot be sent; and if a 7-digit mobile number is transmitted to the PSAP, then a cell site ID cannot be sent. In order to furnish sufficient information to enable a PSAP to identify a cell site for a mobile caller, CAMA signaling will need to be enhanced to permit the transmission of 15 digits of information. The required 15 digits would consist of a 10-digit mobile ID number (i.e., a 3-digit area code (the use of which is more prevalent in mobile systems for local callers and roamers) and a 7-digit mobile telephone number), plus a 5-digit cell site ID number. Current CAMA signaling limitations also apply where a mobile switch sends information directly to a PSAP.

Implementing STEP I ALI features will require mobile carriers to work with Local Exchange Carriers (LECs), PSAPs and others to resolve a variety of

coordination issues. For example, a determination would need to be made as to where to route a 911 call when several options may be available, such as where a carrier's service area or a given cell site cover multiple state or local jurisdictions. Moreover, in adjacent market areas, especially where cell sites overlap, the cellular carrier receiving a 911 call may vary depending on signal strength and environmental conditions on any given day, possibly resulting in a 911 call being routed to a different PSAP than if the other carrier had captured the 911 call. These and other issues will need to be addressed by mobile carriers, LECs, PSAPs and other interested parties prior to implementing these basic ALI capabilities.

Enhancing 911 CAMA signaling capabilities and resolving the foregoing and other coordination issues will take more than one year. Accordingly, Vanguard urges the Commission to establish a three-year time period for implementing STEP I ALI.

STEP II

In the second stage, the Commission proposes to require that, three years after the effective date of the order adopting rules in this proceeding, the ALI information provided to the PSAP must include an estimate of the approximate location and the distance of the mobile unit from the receiving base station or cell site, calculated on the basis of received signal strength or by some other method. The Commission seeks comment on all aspects of this proposal, including the suggested time provided for licensees and equipment manufacturers to develop these features. The Notice specifically seeks comment on the assumption that if a signal is received

by more than one cell site, the site at which the signal is strongest becomes the controlling site for the call.

Vanguard submits that estimating the approximate location and distance of the mobile unit from the receiving base station or cell site is a logical second step in the progression toward advanced ALI. However, more than three years' time will be needed for implementing these features, and the Commission therefore should adopt a more liberal schedule. Specifically, Vanguard respectfully urges the Commission not to require implementation of these second stage ALI features until 5 years from the effective date of the new rules.

Determining a mobile unit's approximate location and distance from the receiving base station or cell site on the basis of received signal strength, or other method, is not as precise a measurement as may be envisioned at first blush. Weather, foliage and other environmental factors can affect signal strength and thereby distort apparent distances. Because these factors will not affect all cell sites equally and can vary over time, it is likely that obtaining useful location and distance information will be a very complex task. Moreover, in a context where the unit is mobile, measuring signal strength of a call at any given moment may not be particularly useful when the mobile unit is traveling, can experience handoff to one or more other cells, possibly even to other carriers, and may even traverse multiple jurisdictions. Finally, and perhaps most important, signal strength calculations are not reliable in some digital technologies like CDMA because power levels are

controlled and change frequently, thereby rendering signal strength ineffective device for measuring location and distance.

As a practical matter, precise standards and methods for implementing STEP II ALI features will need to be formulated so these and other issues can be resolved. It will also be important to develop mature location techniques that will operate in a mobile environment that utilizes multiple RF access technologies (both analog and digital). For these reasons, Vanguard urges the Commission to extend the proposed time period for implementing STEP II ALI features from 3 to 5 years.

STEP III

In the third stage, the Commission proposes to require that, five years after the effective date of its order adopting rules, the mobile station be located in a 3-dimensional environment within a radius of no more than 125 meters. The Notice states that this information should enable the PSAP to assist emergency services personnel by providing a relatively precise location for a 911 caller using a wireless service, but that even greater accuracy could be necessary in urban environments to determine the precise location of a caller within a multi-story structure.

Vanguard believes that adopting specific rules and timetables for mobile stations to be located in a 3-dimensional environment within a radius of 125 meters is premature at this time. It is extremely unlikely that the difficult task of achieving such precise location information can be accomplished within 5 years, or that the Commission's objectives for advanced ALI can be achieved cost-effectively within that time frame. Given that ALI technologies exist today at only a very basic level,

Vanguard submits that the better approach would be for the Commission to announce that it will commence a further rulemaking, at the end of 5 years, regarding the implementation of advanced (STEP III) ALI features after conclusion of that further proceeding. In the interim, while STEP I and STEP II ALI features are being implemented, the Commission should encourage standards bodies and industry to work diligently toward technically-sound, cost-effective results that will permit implementation of advanced (STEP III) ALI within this extended time frame. The Commission should also closely monitor developments, devoting whatever staff and other resources are necessary to spur progress in this area. The Commission could, of course, accelerate commencement of this further rulemaking phase on advanced (STEP III) ALI before 5 years should developments warrant.

The evolution toward advanced ALI capabilities in a dynamic, 3-dimensional environment must proceed in a logical progression of steps so that advanced ALI features that are technically sound and affordable can be developed and deployed. Vanguard has stressed throughout these comments the importance of developing technical standards as a priority matter so that state-of-the-art technologies will evolve and perform well in a complex mobile environment, and so that enhanced 911 hardware and software products will become affordable. Many tasks need to be accomplished. Existing inband CAMA signaling used in today's enhanced 911 networks will need to be enhanced. Cellular and other mobile communications technologies will need to move into a Signaling System 7 (SS7) environment or to advanced intelligent networks in order to support dynamic, 3-dimensional location

capabilities.[9/] As noted earlier, it is critical that a single technical standard for advanced ALI be established to cover multiple RF access systems. Standards work is complicated and takes considerable time, and more time will be needed to develop functionality, complete field testing, and ultimately to manufacture and install products that will achieve the important objective set out in this proceeding. For these reasons, Vanguard believes the Commission should not adopt rules and timetables for implementing STEP III ALI features now, but should defer doing so until a subsequent rulemaking to be commenced in 5 years, or earlier if developments warrant. In the meantime, while STEPS I and II ALI features progress toward implementation, the FCC should support ongoing standards work and other efforts that will make advanced STEP III ALI ultimately happen.

C. Re-Ring/Call Back

The Notice requests comments on the technical and economic feasibility of requiring wireless services to provide the capability to return calls placed from mobile radio transmitters to a 911 emergency number immediately. The Commission proposes to require that, within three years of the effective date of the order adopting rules in this proceeding, wireless systems must provide PSAP attendants with the capability to call back the 911 caller if the call is disconnected.

9/ The Notice points out that the Network Reliability Council has recommended that, before 911 calls are handled by SS7, standards bodies must determine whether additional standards are needed for SS7 protocols. (See Notice at ¶53).

Developing the capability to call back a 911 caller will require enhancements to the existing inband CAMA signaling used by 911 networks today. Current 911 signaling technologies used in landline networks support the transmission of a local 7-digit phone number only. This is a sufficient capability for calling back 911 calls on landline networks, which typically do not need to transmit a 3-digit area code. In a mobile environment, however, the current 911 CAMA signaling standard would need to be expanded from its present 7-digit capability to permit the transmission of 10 digits (i.e., a 3-digit area code plus a 7-digit phone number) so that return calls to mobile units could be accomplished. The transmission of area code information is essential for a mobile systems to identify both local callers and roamers, and current signaling technology will need to be expanded for that purpose.

Based on discussions with its principal equipment vendor, Vanguard believes that three years is sufficient to accomplish the necessary technical tasks that will be required to implement 911 call back capabilities. Accordingly, Vanguard supports the Commission's proposal as set forth in the Notice.

D. Equipment Manufacturer, Importation and Labeling

The Notice solicits comment on whether it may be necessary to establish specific requirements for base and mobile transmitters to ensure compliance with the objectives of this proceeding, particularly with regard to ANI and ALI, and as to what those standards should be. If specific requirements for transmitters are necessary, the Commission contemplates the submission of information demonstrating compliance as part of its equipment authorization process, and asks whether it may be

appropriate to establish cut-off dates for manufacture, importation and marketing of equipment that may not meet the standards. The Commission also requests comment on a specific labeling proposal to alert persons using mobile transmitters for 911 calls that the person answering may not know the location of the caller or have the ability to call back.

Vanguard believes it may be appropriate ultimately for the Commission to establish specific requirements for base or mobile transmitters to ensure compliance with the objectives of this proceeding, and to establish cut-off dates for the manufacturer, importation and marketing of equipment that does not meet the standards. These issues should be addressed in detail by equipment manufacturers who will be the most directly affected by any rules which the Commission may adopt. However, Vanguard submits the following general principles for consideration on these issues.

First, it is not yet clear whether the implementation of various enhanced 911 technologies, including ANI and ALI, will require new features to be included in network equipment or subscriber equipment or both. As observed in the Notice, certain technologies, such as that described by KSI, would not require such features to be included in the mobile transmitter. Until standards bodies and manufacturers have progressed further toward developing functional products, it may be premature for the Commission to adopt specific requirements now for base and mobile equipment.

Second, any cut-off dates that are adopted by the Commission must obviously relate closely to the time frames when specific 911 features become technically capable of implementation. In view of the current state of location technologies, and considering that standards and other difficult work must be done before 911 capabilities like advanced ALI become a reality, it may not be appropriate for the Commission to adopt specific cut-off dates at this time. Instead the Commission could formulate specific equipment requirements and cut-off dates during ongoing phases of this proceeding as enhanced 911 technologies and products develop and mature.

Finally, to the extent equipment requirements are adopted for subscriber equipment, Vanguard urges the Commission to "grandfather" subscriber equipment in existence at the time new requirements become effective. It would be a logistical nightmare and very costly for cellular carriers to recall approximately 20 million mobile handsets in use on cellular systems today. Hopefully technologies will develop so that most enhanced 911 features can be implemented at the system network level. However, to the extent handsets will need to embody ALI or other enhanced 911 capabilities, a "grandfathering" provision for current units would be the most sensible and least disruptive approach. This would permit existing customers to attain enhanced 911 capabilities voluntarily over time, or as subscriber equipment is replaced or upgraded in the normal course. As handsets are replaced, a trend which may accelerate as digital buildouts occur, the number of "grandfathered" units would decline steadily.

Vanguard believes that adopting requirements for labeling subscriber equipment could also cause confusion and result in more harm than good. First, as a practical matter, people are not likely to take time to read handset labels or focus on specific enhanced 911 capabilities in emergency situations. Of course, it may be useful for a mobile customer to know ahead-of-time that its cellular or other mobile system has limitations vis-a-vis certain enhanced 911 features. Knowing such limitations could assist a 911 caller to furnish sufficient location and other information to emergency services personnel during the course of a 911 call. Rather than labeling handsets, however, this information may be communicated, as it is today, by emergency services personnel who routinely request location and other information from a 911 caller. Rather than requiring equipment labeling, a better way for mobile system carriers to educate subscribers about the limitations of mobile networks, and about new capabilities as they become available, is through direct carrier-subscriber communications, such as correspondence, newsletters, billing "stuffers" and other means of informing customers about mobile system services.

Second, to the extent ALI and other enhanced 911 features are implemented at the network level, the labeling of subscriber equipment to describe 911 capabilities would be accurate only for a short time while advanced 911 features have yet to be installed in a mobile network. Handset labels would, however, eventually become inaccurate, thereby providing false information, once mobile networks are upgraded with enhanced 911 capabilities in due course. Moreover, in a roamer context, while handset labeling might accurately reflect home system

capabilities, a mobile unit may roam on more mature systems which have already upgraded to enhanced 911 features. Again, the labeling would be inaccurate because enhanced 911 features would in fact be accessible to the roamer, but the equipment label would wrongly indicate that such features were unavailable. Thus, labeling subscriber equipment in the context of evolving technologies is not a practical solution for keeping mobile users informed about system capabilities.

Finally, to the extent the Commission decides to impose labeling on subscriber equipment for any purpose, it should "grandfather" units in existence at the time such requirements take effect. Labeling an existing base of approximately 20 million cellular handsets, and even greater numbers as mobile system subscriptions increase, would be logistically impossible and extremely expensive. Grandfathering existing units would be entirely appropriate, especially considering that cellular handsets have already been in use for more than a decade without such labeling. Enhanced 911 features will be available in progressive stages beginning relatively soon, and there would be no purpose served by imposing labeling requirements on a large base of existing units, particularly if upgrades for enhanced 911 are implemented primarily at the network level. Even if certain location technologies require new equipment to be installed in mobile transmitters, grandfathering would be appropriate because labeling the large number of existing units could not be justified under any cost-benefit analysis.

IV. CONCLUSION

Vanguard supports the Commission's objective of ensuring broad availability of 911 and enhanced 911 services to users of wireline and wireless telephone networks whose health and safety may depend on 911 emergency service systems. To achieve this goal, the Commission should encourage the development of technical standards and other cost-effective solutions for implementing enhanced 911 services in a wireless environment. However, the Commission should not adopt rules or timetables that unreasonably require cellular and other CMRS carriers to implement enhanced 911 features before standards work is complete and advanced technologies are ready to be deployed.

Respectfully submitted,

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January 9, 1995

CERTIFICATE OF SERVICE

I, Deborah E. Buhner, a secretary at the law firm of Dow, Lohnes & Albertson, do hereby certify that on this 9th day of January, 1995, I have had hand delivered the foregoing "COMMENTS" to the following:

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